**Achievement objectives: Physics 2012**

**Physics provides explanations for a wide range of physical phenomena, including light, sound, heat, electricity, magnetism, waves, forces, and motion, united by the concept of energy, which is transformed from one form into another without loss.**

*The New Zealand Curriculum* specifies two sets of achievement objectives for physics:

* Physical inquiry and physics concepts
* Using physics

The curriculum also specifies four sets of achievement objectives for the Nature of Science strand:

* Understanding about science
* Investigating in science
* Communicating in science
* Participating and contributing

The focus of the contextual strands is the ideas *of*science; the focus of the Nature of Science strand is ideas *about*science. Scientific literacy is developed through learning in both kinds of ideas.

**Progression in physics**

Students’ progress in learning physics is demonstrated by their ability to identify and apply physics concepts to situations of increasing complexity, and to evaluate physics investigative methods to make decisions about the validity of results and subsequent conclusions.

As they progress, students move:

* from applying concepts to familiar situations to understanding the interrelated nature of concepts
* from carrying out simple data collections to critically analysing investigative methods and the resulting data.

**Indicators**

Indicators are examples of the behaviours and capabilities that a teacher might expect to observe in a student who is achieving at the appropriate level. Teachers may wish to add further examples of their own.

**Context elaborations**

Context elaborations are possible contexts for learning, with a suggestion of how they might be used with the focus achievement objective.

The listed context elaborations are examples only. Teachers can select and use entirely different contexts in response to local situation, community relevance, and students’ interests and needs.

[TOP](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics#wrapper)

**NCEA: What has changed?**

* The achievement standards have been designed to align with the NZC, and reflect the change in direction for science education. Most existing programmes will need to be reshaped to meet the achievement aims for science, and in particular the Nature of Science.
* The Nature of Science aims and objectives have been embedded and integrated into all standards.
* The explanatory notes for each standard indicate which science achievement objectives are the focus.
* Key terms such as 'investigate', 'demonstrate understanding' and 'justify' are fully explained in the explanatory notes.
* The additional information/teacher guideline sections of exemplar resources (internal tasks) provide further guidance around how the Nature of Science is involved, for example, Science 1.6A.
* See assessment for qualifications section for each achievement objective. This suggests possible assessment activities related to each particular achievement objective.

**Achievement objectives**

Students will:

**Level 6**

**Physical inquiry and physics concepts**

* [PW 6-1](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics/AO-PW-6-1) Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics); Demonstrate an understanding of physical phenomena and concepts by explaining and solving questions and problems that relate to straightforward situations.

**Using physics**

* [PW 6.2](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics/AO-PW-6-2) Investigate how physics knowledge is used in a technological or biological application.

**Level 7**

**Physical inquiry and physics concepts**

* [PW 7-1](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics/AO-PW-7-1) Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of unfamiliar situations; Analyse data to deduce complex trends and relationships in physical phenomena.

**Using physics**

* [PW 7-2](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics/AO-PW-7-2) Use physics ideas to explain a technological or biological application of physics.

**Level 8**

**Physical inquiry and physics concepts**

* [PW 8-1](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics/AO-PW-8-1) Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of complex situations; Analyse and evaluate data to deduce complex trends and relationships in physical phenomena.

**Using physics**

* [PW 8-2](http://seniorsecondary.tki.org.nz/Science/Achievement-aims/AOs-by-strand/AOs-Physics/AO-PW-8-2) Use physics ideas to explain a technological, biological, or astronomical application of physics and discuss related issues.